

Please type a plus sign (+) inside this box → ☐

PTO/SB/05 (4/98)
Approved for use through 09/30/2000. OMB 0651-0032
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No. NETS0059

First Inventor or Application Identifier Behera

Title Simplified LDAP Access Control Language System

Express Mail Label No. EL090780523US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☒ * Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
2. ☒ Specification [Total Pages 18]
(preferred arrangement set forth below)
 - Descriptive title of the invention
 - Cross References to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to Microfiche Appendix
 - Background of the invention
 - Brief Summary of the invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
3. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 4]
4. Oath or Declaration [Total Pages 2]
 - a. ☒ Newly executed (original or copy)
 - b. ☐ Copy from a prior application (37 C.F.R. § 1.63(d))
(for continuation/divisional with Box 16 completed)
 - i. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

* NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

ADDRESS TO:

Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

ACCOMPANYING APPLICATION PARTS

7. ☒ Assignment Papers (cover sheet & document(s))
8. ☐ 37 C.F.R. § 3.73(b) Statement (when there is an assignee) ☒ Power of Attorney
9. ☐ English Translation Document (if applicable)
10. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations
11. ☐ Preliminary Amendment
12. ☒ Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
13. ☐ * Small Entity Statement filed in prior application, Status still proper and desired (PTO/SB/09-12)
14. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
15. ☐ Other:

16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No. _____ / _____

Prior application information: Examiner _____ Group / Art Unit: _____

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS

☒ Customer Number or Bar Code Label

22862

or ☐ Correspondence address below

(Insert Customer No. or Attach bar code label here)

Name

Address

City

State

Zip Code

Country

Telephone

Fax

Name (Print/Type)

Michael A. Glenn

Registration No. (Attorney/Agent)

30,176

Signature

Date

11/22/1999

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231.

Simplified LDAP Access Control Language System

5

BACKGROUND OF THE INVENTION

TECHNICAL FIELD

10

The invention relates to accessing information from a directory structure in a computer environment. More particularly, the invention relates to controlling access to data within an LDAP directory structure in a computer environment.

15

DESCRIPTION OF THE PRIOR ART

20

A Lightweight Directory Access Protocol (LDAP) directory (such as Netscape Communications Corporation's Directory Server) is a collection of "entries." Each entry has a name (called the Distinguished Name) and a list of attribute values. The entries in a directory are organized in a tree structure, with major groupings that are subdivided into smaller units. A directory might contain several organization entries, each of which contains several organizationalUnit entries. These entries can be further subdivided.

25

LDAP provides search operations that can be performed over specified portions of the directory tree. Trees and subtrees, therefore, are a natural way to deal with data stored in an LDAP directory.

30

Entries and attributes correspond to a wide variety of data types such as personnel information, server configuration, business relationships, and user preferences. Since all entries are stored within a single directory, a method is required to restrict the availability of specific information to authorized users.

35

The method used to control access is via Access Control Lists (ACL). The Directory Server Administrator (DSAdmin) creates some basic ACL rules that grant permission to

certain users to access various information in the directory. Most of the security considerations will require from tens to hundreds of rules to implement. The smaller number of ACL rules offers better performance and easier manageability.

5 Because a directory is the critical central repository in an intranet containing collections of information, *e.g.*, about people, it is imperative that a rich set of access options/features be provided. For example, the user should be able to modify his entry, or to update his home address or home phone number without any DSAdmin intervention.

10 A better feature would be to give the user the ability to decide who can access some of his personal information. The only way to do that is to allow users to create ACLs. However, a directory can contain millions of entries such as the directory used by Netscape's Netcenter. To support this size of a directory using the traditional approach would require millions of ACLs which would not only degrade the server's performance but would also be highly unmanageable. It also creates a risk, *i.e.*, the user can create a rule denying the DSAdmin some privileges which is unacceptable.

15 Another disadvantage is that ACL syntax are generally complex. A normal user is unable to understand the format and fields of the rules to be able to use the rules effectively and safely.

20 It would be advantageous to provide a simplified LDAP access control language system that gives the system administrator the ability to allow a user to specify a list of people that have access to certain attributes of that user's directory entry information. It would further be advantageous to provide a simplified LDAP access control language system that provides
25 a simple mechanism to allow a user to make those specifications.

SUMMARY OF THE INVENTION

30 The invention provides a simplified LDAP access language system. The system provides a simple command language that allows a system administrator to give a user the flexibility to specify a list of people that have access to certain attributes in a directory entry. In addition, the invention provides a system that allows a user to easily specify access lists
35 without having to learn a complicated command syntax.

A preferred embodiment of the invention provides user-defined attributes that tell the directory system who the user wants to give read or write access to a specific set of his attributes. The read and write attributes are separate lists and may, in fact, differ. This gives the user the flexibility to better manage access to his attributes.

5

The value of the read and write attributes are in an LDAP Filter format which is an Internet standard (RFC 2254). The filter properties allow the user to specify not only users local to his intranet, but users across the Internet as well.

- 10 Access control lists (ACL) are created by the System Administrators. The ACLs list the specific attributes that the user is allowed to control read or write access. This gives the Administrators full control of what information the user can give out.

15

The ACLs are stored in the directory along with the entries. When a user accesses an entry in a directory, the server checks the ACL specified for the attributes being accessed. The read or write attribute for the owner of the attributes being accessed are used by the server when it checks the ACL. The combination of the read or write attribute and the ACL determine whether the user has permission to perform the read or write access to the attribute being accessed.

20

Other aspects and advantages of the invention will become apparent from the following detailed description in combination with the accompanying drawings, illustrating, by way of example, the principles of the invention.

25

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a diagram of an LDAP directory entry according to the invention;

- 30 Fig. 2 is a schematic diagram of an example of how n attributes are accessed according to the invention;

Fig. 3 is a block schematic diagram depicting the organization of users in a company hierarchical tree according to the invention; and

35

Fig. 4 is a block schematic diagram of a directory including ACLs, entries and read/write attributes according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

5 The invention is embodied in a simplified LDAP access control language system in a computer environment. A system according to the invention provides a simple command language that allows a system administrator to give a user the flexibility to specify a list of people that have access to certain attributes in a directory entry. In addition, the invention provides a system that allows a user to easily specify access lists without having to learn a
10 complicated command syntax.

15 A Lightweight Directory Access Protocol (LDAP) directory (such as Netscape Communications Corporation's Directory Server) is a collection of "entries." Each entry has a name (called the Distinguished Name) and a list of attribute values. The entries in a directory are organized in a tree structure, with major groupings that are subdivided into smaller units. A directory might contain several organization entries, each of which contains several organizationalUnit entries. These entries can be further subdivided.

20 LDAP provides search operations that can be performed over specified portions of the directory tree. Trees and subtrees, therefore, are a natural way to deal with data stored in an LDAP directory.

25 Entries and attributes correspond to a wide variety of data types such as personnel information, server configuration, business relationships, and user preferences. Since all entries are stored within a single directory, a method is required to restrict the availability of specific information to authorized users.

30 The method used to control access is via Access Control Lists (ACL). The Directory Server Administrator (DSAdmin) creates some basic ACL rules that grant permission to certain users to access various information in the directory. Most of the security considerations will require from tens to hundreds of rules to implement. The smaller number of ACL rules offers better performance and easier manageability.

35 Because a directory is the critical central repository in an intranet containing collections of information, e.g., about people, it is imperative that a rich set of access options/features be

provided. For example, the user should be able to modify his entry, or to update his home address or home phone number without any DSAdmin intervention.

5 A better feature would be to give the user the ability to decide who can access some of his personal information. The only way to do that is to allow users to create ACLs. However, a directory can contain millions of entries such as the directory used by Netscape's Netcenter. To support this size of a directory would require millions of ACLs which would not only degrade the server's performance but would also be highly unmanageable. It also creates a risk, *i.e.*, the user can create a rule denying the DSAdmin some privileges which is
10 unacceptable.

Another disadvantage is that ACL syntax are generally complex. A normal user is unable to understand the format and fields of the rules to be able to use the rules effectively and safely.

15 The problems that are presented are:

- How to let users manage some of their own information.
 - How can the DSAdmin manage the information so that no security rules are violated.
 - How to make the server manageable under the above circumstances.
- 20

Ideally, a DSAdmin would like to have rules that perform the following tasks (out of n attributes in a directory):

- 25
1. Allow n_1 attributes to be read by anyone in the world (this is a typical requirement). Example attributes are cn, sn, phonenumber.
 2. Allow n_2 attributes to be read and modifiable by the user himself, *e.g.*, home address, home phonenumber.
 3. Allow n_3 attributes to be managed by an owner/manager, *e.g.*, salary, employeegrade.
 - 30 4. Allow n_4 attributes to be managed by the user, *i.e.*, the user decides who can read or modify the attributes, For example, the user can decide that only Sam can read his hobbies attribute and only Kelly can read or change emergency contact info so that she can keep it up to date.
 - 35 5. Do not allow the rest $n_5 = [n - (n_1 + n_2 + n_3 + n_4)]$ attributes to be accessible to the general public except for the Administrator group, *e.g.*, employee status.

Solving 1, 2, 3 & 5 are fairly straightforward and will be explained below. The only difficult item is the 4th case. As previously mentioned, to enable this feature requires that the user be provided the ability to create his own ACLs. This could lead to millions of ACLs - which is not acceptable. The remainder of this document describes a novel approach to overcome these problems using a few ACLs and an existing Internet standard.

One area where this is applicable is in Netscape's Netcenter which has a registry of Netcenter members. All of the member information is stored in a directory server. The Netcenter Administrators would not only prefer to maintain the member's information/profiles but would also like to provide flexibility to allow members to maintain some other key information which other members can access. There is an immediate need with no current solution that can take care of this problem in an elegant way.

One skilled in the art will readily appreciate that although LDAP directories are mentioned throughout, the invention can be implemented in any directory application. Additionally, although the examples cited concern attributes pertaining to people, one skilled in the art will readily appreciate that the invention can control access to any attributes stored in a system.

Referring to Fig. 1, an example of a person's LDAP directory entry 101 is shown. Attributes are listed that pertain to a particular individual. Some of these attributes are controlled by the Administrator 102, e.g., dn, sn, uid. A certain number of attributes 103 are the attributes that the user wants to control read and write access, e.g., hobbies, homepage, personalpage.

The LDAP standard is very flexible. It allows extension of the schema by adding new attributes or objectclasses. One can add a new attribute called "hobbies" 107 to an entry as long as the objectclass which has that attribute has been added.

With respect to Fig. 2, the ideal situation is when, given n attributes 201, some of the attributes are public 202, e.g., telephonenumber, where any user can see them. Other attributes are private and are not normally available to other users. For example, department admins and managers can only access a person's salary attribute 203 or only super admins can access a person's employee status 204. The final set of attributes are the ones that the user controls 205, e.g., hobbies, homepage, and personalpage.

The following ACL syntax is used to explain how cases 1, 2, 3, & 5 are solved. Note, the syntax is used for reference only.

- Allow n1 attributes to be read by anyone:

ACL: (list of n1 attrs) (allow (read) user = "anyone")

- Allow n2 attributes to be read/writeable by self:

ACL: (list of n2 attrs) (allow (read, write) user = "self")

- Allow n5 attrs to be read/writeable by the admin group only:

ACL: (list of n5 attrs) (allow (read, write) group = "Admingroup")

- Allow the owner or the manager to manage the n3 attributes:

ACL:(list of n3 attributes) (allow (read, write) attr="manager" or attr = "owner")

Referring again to Fig. 1, user Prasanta's 108 manager is Claire 109 and she can read/write the list of n3 attributes. Similarly, Joe's manager, Bill, can read/modify Joe's n3 attributes. This is achieved by using one ACL. The value of the "manager" is plugged in at runtime.

For case 4, the requirements are more complex. Out of the n4 attributes, a finer granularity must be achieved, *i.e.*, the n4 attributes can be read by certain people (n4-read attrs) and can be modified by certain people (not necessarily the same people that can read the attributes) (n4-write attrs). A preferred embodiment of the invention solves the 4th case by providing an ACL similar to the other cases, but also using user-defined attributes.

Referring again to Fig. 1, the user-defined attributes 104 tell the system who the user wants to give permission to read 105 and write 106 to his attributes 103. It is evident that the read 105 and write 106 attributes are separate lists and may, in fact, differ. This gives the user the flexibility to better manage access to his attributes.

The invention's ACL syntax is as follows (using the example discussed earlier):

ACL: (list of n4-read attrs) (allow (read) filterattr= "whocanreadattr")

Ex: (hobbies, emergencyContact) (allow (read) filterattr= " whocanreadattr ")

ACL: (list of n4-write attrs) (allow (write) filterattr= "whocanwriteattr")

Ex: (emergencyContact) (allow (write) filterattr= " whocanwriteattr ")

where the values of a whocanreadattr & whocanwriteattr are:

whocanreadattr: (((ldap:///o=abc.com?(uid=sam)) (uid=kelly))

5 whocanwriteattr: (uid=kelly)

The value of the read and write attributes are in an LDAP Filter format which is an Internet standard (RFC 2254). The ACLs are created by the DSAdmin. This gives the DSAdmin full control of what information the user can give out. With respect to Fig. 3, the filter properties allow the user to specify not only users local to his intranet, but users across the Internet as well. In the example above, Prasanta 303 and Kelly 304 are users 302 in the same company, Netscape 301. The "whocanreadattr" gives Sam who is from ABC company and Kelly who is from Netscape, read access.

Referring to Fig. 4, the ACLs 402 are stored in the directory 401 along with the entries 403. When a user accesses an entry 403 in a directory 401, the server checks the ACL 402 specified for the attributes being accessed. The read 404 or write 405 attribute for the owner of the attributes being accessed are used by the server when it checks the ACL 402.

Using the above example, the value of "whocanwriteattr" is plugged in by the server at runtime with "(uid=kelly)". So, if Kelly is the accessing client, the filter matches to TRUE and Kelly is allowed to modify the "emergencyContact" attribute. However, if Bill is the client, the filter matches to FALSE and Bill is denied the privilege. Each user can now create LDAP Filters which will allow them to manage their own information.

The advantages of the invention are:

- The Admin has complete control of what a user can do.
- Only a handful of ACLs are needed instead of millions.
- The performance of the server is markedly increased.
- The value of the new attributes are based on an Internet standard.

Although the invention is described herein with reference to the preferred embodiment, one skilled in the art will readily appreciate that other applications may be substituted for those

set forth herein without departing from the spirit and scope of the present invention. Accordingly, the invention should only be limited by the Claims included below.

CLAIMS

1. A process for a simplified access control language that controls access to directory
5 entries in a computer environment, comprising the steps of:

providing a user defined read list containing user identifications that are allowed to
read a specified set of attributes;

providing a system administrator defined read access control command;

10 said read access control command listing the user attributes that said administrator
has selected for user defined read access; and

said read access control command referring to said user defined read list thereby
allowing said read user identifications read access to said user attributes.

15 2. The process of Claim 1, wherein upon a client read access, the directory server
selects a specific read access control command according to the attribute being accessed
and refers to the read list of the owner of the attribute being accessed to determine if said
client has permission to execute said read access.

20 3. The process of Claim 1, further comprising the steps of:

providing a user defined write list containing user identifications that are allowed to
write a specified set of attributes;

providing a system administrator defined write access control command;

25 said write access control command listing the user attributes that said administrator
has selected for user defined write access; and

said write access control command referring to said user defined write list thereby
allowing said write user identifications write access to said user attributes.

30 4. The process of Claim 3, wherein upon a client write access, the directory server
selects a specific write access control command according to the attribute being accessed
and refers to the write list of the owner of the attribute being accessed to determine if said
client has permission to execute said write access.

35 5. A process for a simplified access control language that controls access to directory
entries in a computer environment, comprising the steps of:

providing a system administrator defined read access control command that lists the user attributes that said administrator has selected for user defined read access;

providing a system administrator defined write access control command that lists the user attributes that said administrator has selected for user defined write access;

5 providing a plurality of user defined read lists containing user identifications that are allowed to read said user attributes that said administrator has selected for user defined read access; and

10 providing a plurality of user defined write lists containing user identifications that are allowed to write said user attributes that said administrator has selected for user defined write access;

wherein when a client read access to one of the user attributes that said administrator has selected for user defined read access occurs, said read access control command and the read list of the owner of the attribute being accessed are used to determine if said client has permission to execute said read access; and

15 wherein when a client write access to one of the user attributes that said administrator has selected for user defined write access occurs, said write access control command and the write list of the owner of the attribute being accessed are used to determine if said client has permission to execute said write access.

20 6. A process for a simplified access control language that controls access to directory entries in a computer environment, comprising the steps of:

providing a user defined write list containing user identifications that are allowed to write a specified set of attributes;

providing a system administrator defined write access control command;

25 said write access control command listing the user attributes that said administrator has selected for user defined write access; and

said write access control command referring to said user defined write list thereby allowing said write user identifications write access to said user attributes.

30 7. The process of Claim 6, wherein upon a client write access, the directory server selects a specific write access control command according to the attribute being accessed and refers to the write list of the owner of the attribute being accessed to determine if said client has permission to execute said write access.

35 8. The process of Claim 6, further comprising the steps of:

providing a user defined read list containing user identifications that are allowed to read a specified set of attributes; and

providing a system administrator defined read access control command;

wherein said read access control command lists the user attributes that said administrator has selected for user defined read access; and
wherein said read access control command refers to said user defined read list thereby allowing said read user identifications read access to said user attributes.

9. The process of Claim 8, wherein upon a client read access, the directory server selects a specific read access control command according to the attribute being accessed and refers to the read list of the owner of the attribute being accessed to determine if said client has permission to execute said read access.

10. An apparatus for a simplified access control language that controls access to directory entries in a computer environment, comprising:

a user defined read list containing user identifications that are allowed to read a specified set of attributes; and

a system administrator defined read access control command;

wherein said read access control command lists the user attributes that said administrator has selected for user defined read access; and

wherein said read access control command refers to said user defined read list thereby allowing said read user identifications read access to said user attributes.

11. The apparatus of Claim 10, wherein upon a client read access, the directory server selects a specific read access control command according to the attribute being accessed and refers to the read list of the owner of the attribute being accessed to determine if said client has permission to execute said read access.

12. The apparatus of Claim 10, further comprising:

a user defined write list containing user identifications that are allowed to write a specified set of attributes; and

a system administrator defined write access control command;

wherein said write access control command lists the user attributes that said administrator has selected for user defined write access; and

wherein said write access control command refers to said user defined write list thereby allowing said write user identifications write access to said user attributes.

13. The apparatus of Claim 12, wherein upon a client write access, the directory server selects a specific write access control command according to the attribute being accessed and refers to the write list of the owner of the attribute being accessed to determine if said client has permission to execute said write access.

14. An apparatus for a simplified access control language that controls access to directory entries in a computer environment, comprising:

a system administrator defined read access control command that lists the user attributes that said administrator has selected for user defined read access;

a system administrator defined write access control command that lists the user attributes that said administrator has selected for user defined write access;

a plurality of user defined read lists containing user identifications that are allowed to read said user attributes that said administrator has selected for user defined read access; and

a plurality of user defined write lists containing user identifications that are allowed to write said user attributes that said administrator has selected for user defined write access;

wherein when a client read access to one of the user attributes that said administrator has selected for user defined read access occurs, said read access control command and the read list of the owner of the attribute being accessed are used to determine if said client has permission to execute said read access; and

wherein when a client write access to one of the user attributes that said administrator has selected for user defined write access occurs, said write access control command and the write list of the owner of the attribute being accessed are used to determine if said client has permission to execute said write access.

15. An apparatus for a simplified access control language that controls access to directory entries in a computer environment, comprising:

a user defined write list containing user identifications that are allowed to write a specified set of attributes; and

a system administrator defined write access control command;

wherein said write access control command lists the user attributes that said administrator has selected for user defined write access; and

wherein said write access control command refers to said user defined write list thereby allowing said write user identifications write access to said user attributes.

16. The apparatus of Claim 15, wherein upon a client write access, the directory server selects a specific write access control command according to the attribute being accessed and refers to the write list of the owner of the attribute being accessed to determine if said client has permission to execute said write access.

17. The apparatus of Claim 15, further comprising:

a user defined read list containing user identifications that are allowed to read a specified set of attributes;

a system administrator defined read access control command;

wherein said read access control command lists the user attributes that said administrator has selected for user defined read access; and

wherein said read access control command refers to said user defined read list thereby allowing said read user identifications read access to said user attributes.

18. The apparatus of Claim 17, wherein upon a client read access, the directory server selects a specific read access control command according to the attribute being accessed and refers to the read list of the owner of the attribute being accessed to determine if said client has permission to execute said read access.

19. A program storage medium readable by a computer, tangibly embodying a program of instructions executable by the computer to perform method steps for a simplified access control language that controls access to directory entries in a computer environment, comprising the steps of:

providing a user defined read list containing user identifications that are allowed to read a specified set of attributes;

providing a system administrator defined read access control command;

said read access control command listing the user attributes that said administrator has selected for user defined read access; and

said read access control command referring to said user defined read list thereby allowing said read user identifications read access to said user attributes.

20. The method of Claim 19, wherein upon a client read access, the directory server selects a specific read access control command according to the attribute being accessed

and refers to the read list of the owner of the attribute being accessed to determine if said client has permission to execute said read access.

21. The method of Claim 19, further comprising the steps of:

5 providing a user defined write list containing user identifications that are allowed to write a specified set of attributes;

providing a system administrator defined write access control command;

said write access control command listing the user attributes that said administrator has selected for user defined write access; and

10 said write access control command referring to said user defined write list thereby allowing said write user identifications write access to said user attributes.

22. The method of Claim 21, wherein upon a client write access, the directory server selects a specific write access control command according to the attribute being accessed and refers to the write list of the owner of the attribute being accessed to determine if said client has permission to execute said write access.

23. A program storage medium readable by a computer, tangibly embodying a program of instructions executable by the computer to perform method steps for a simplified access control language that controls access to directory entries in a computer environment, comprising the steps of:

providing a system administrator defined read access control command that lists the user attributes that said administrator has selected for user defined read access;

20 providing a system administrator defined write access control command that lists the user attributes that said administrator has selected for user defined write access;

25 providing a plurality of user defined read lists containing user identifications that are allowed to read said user attributes that said administrator has selected for user defined read access;

30 providing a plurality of user defined write lists containing user identifications that are allowed to write said user attributes that said administrator has selected for user defined write access;

35 wherein when a client read access to one of the user attributes that said administrator has selected for user defined read access occurs, said read access control command and the read list of the owner of the attribute being accessed are used to determine if said client has permission to execute said read access; and

wherein when a client write access to one of the user attributes that said administrator has selected for user defined write access occurs, said write access control command and the write list of the owner of the attribute being accessed are used to determine if said client has permission to execute said write access.

5

24. A program storage medium readable by a computer, tangibly embodying a program of instructions executable by the computer to perform method steps for a simplified access control language that controls access to directory entries in a computer environment, comprising the steps of:

10 providing a user defined write list containing user identifications that are allowed to write a specified set of attributes;

providing a system administrator defined write access control command;

said write access control command listing the user attributes that said administrator has selected for user defined write access; and

15 said write access control command referring to said user defined write list thereby allowing said write user identifications write access to said user attributes.

20 25. The method of Claim 24, wherein upon a client write access, the directory server selects a specific write access control command according to the attribute being accessed and refers to the write list of the owner of the attribute being accessed to determine if said client has permission to execute said write access.

26. The method of Claim 24, further comprising the steps of:
25 providing a user defined read list containing user identifications that are allowed to read a specified set of attributes; and

providing a system administrator defined read access control command;

wherein said read access control command lists the user attributes that said administrator has selected for user defined read access; and

30 wherein said read access control command refers to said user defined read list thereby allowing said read user identifications read access to said user attributes.

35 27. The method of Claim 26, wherein upon a client read access, the directory server selects a specific read access control command according to the attribute being accessed and refers to the read list of the owner of the attribute being accessed to determine if said client has permission to execute said read access.

Simplified LDAP Access Control Language System

ABSTRACT

5 A simplified LDAP access language system provides user-defined attributes that tell the directory system who the user wants to give read or write access to a specific set of his attributes. The read and write attributes are separate lists and may, in fact, differ, thereby giving the user the flexibility to better manage access to his attributes. The value of the read and write attributes are in an LDAP Filter format which is an Internet standard (RFC 10 2254) which allows the user to specify not only users local to his intranet, but users across the Internet as well. Access control lists (ACL) are created by the System Administrators and list the specific attributes that the user is allowed to control read or write access, giving the Administrators full control of what information the user can give out. The ACLs are 15 stored in the directory along with the entries. When a user accesses an entry in a directory, the server checks the ACL specified for the attributes being accessed. The read or write attribute for the owner of the attributes being accessed are used by the server when it checks the ACL. The combination of the read or write attribute and the ACL determine whether the user has permission to perform the read or write access to the attribute being 20 accessed.

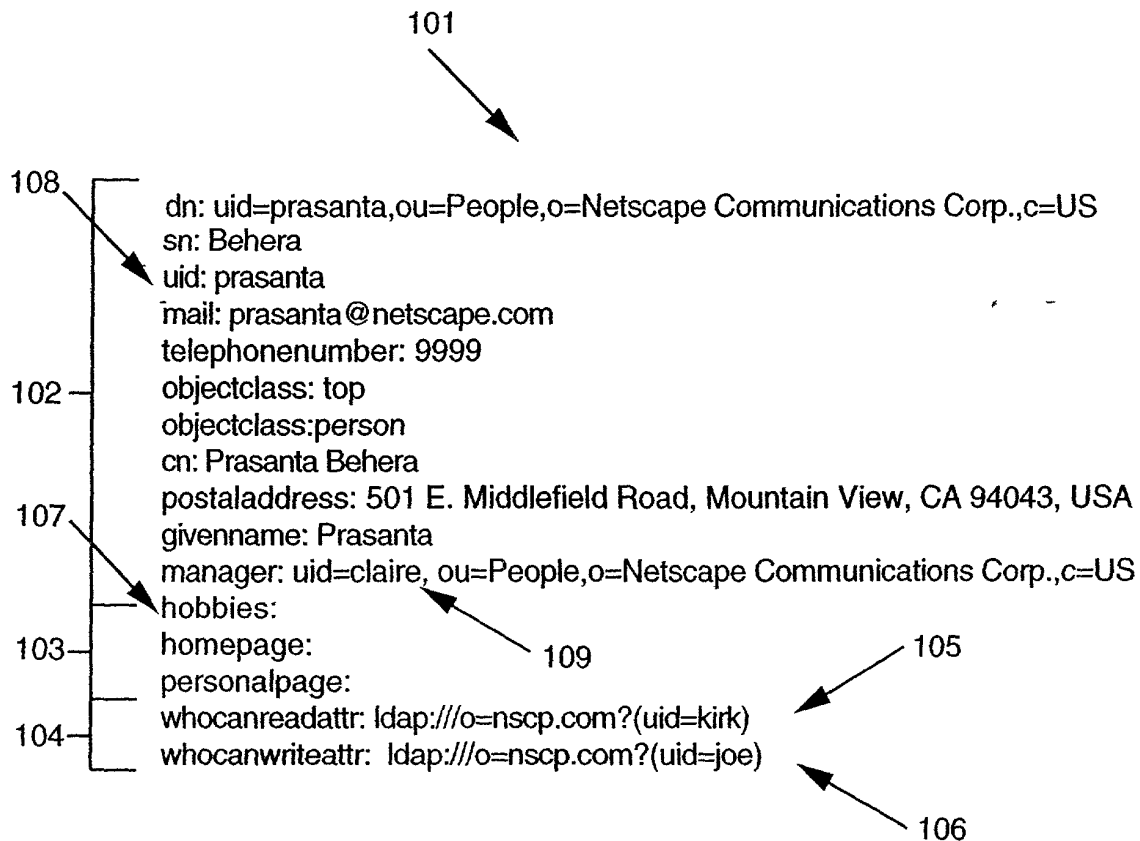


Fig. 1

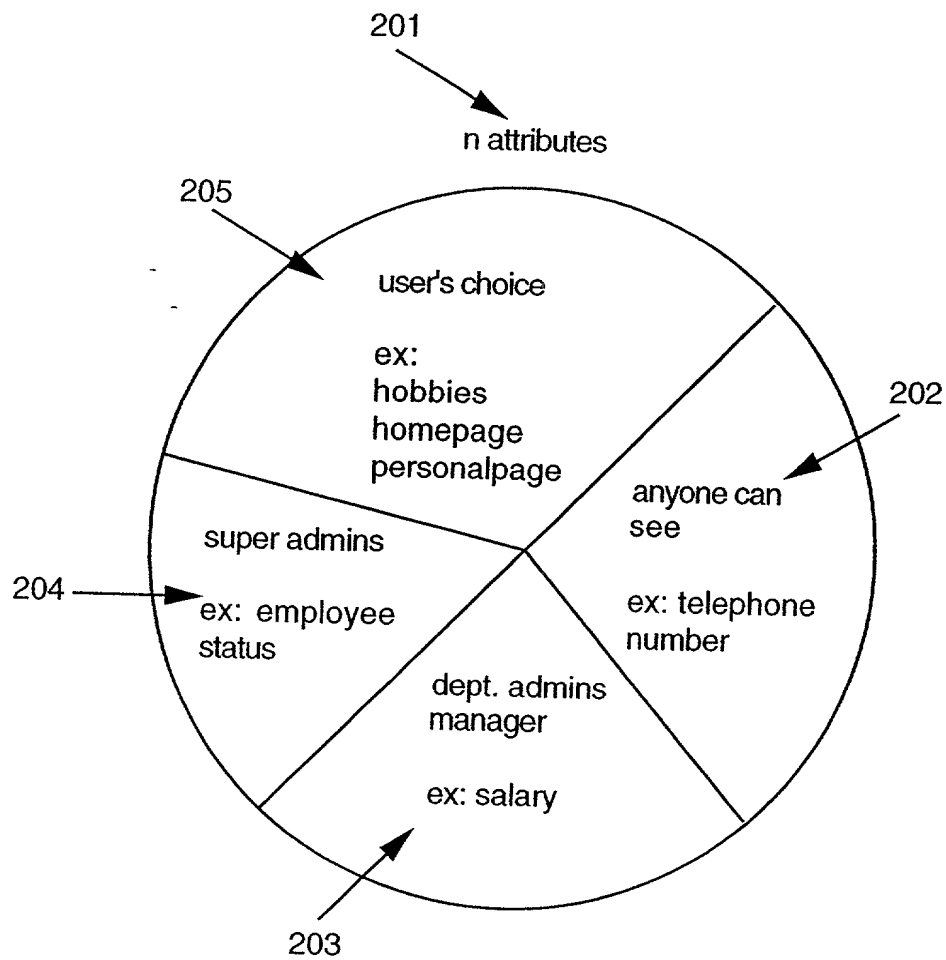


Fig. 2

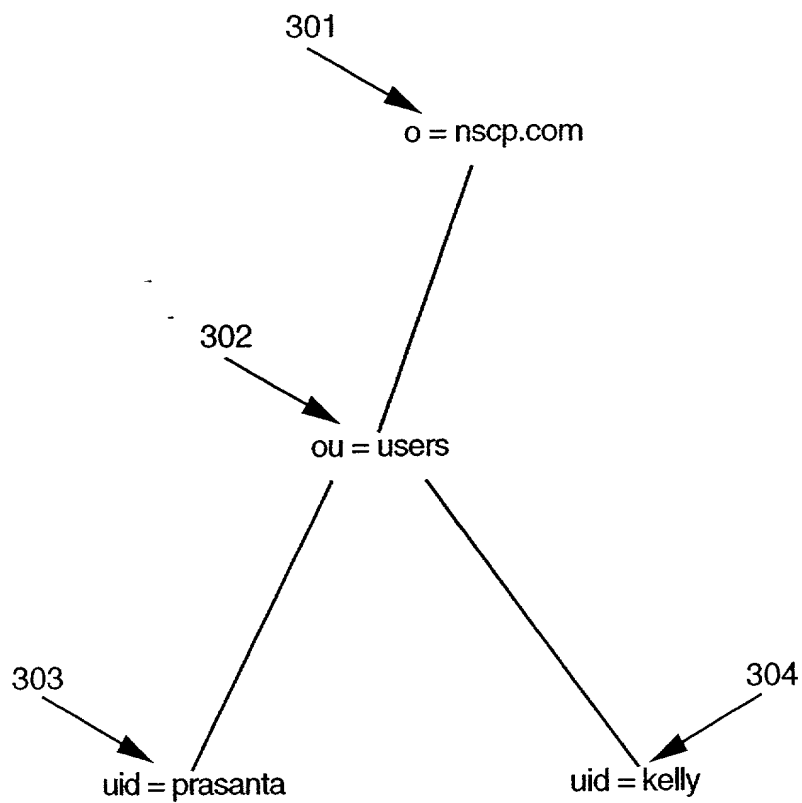


Fig. 3

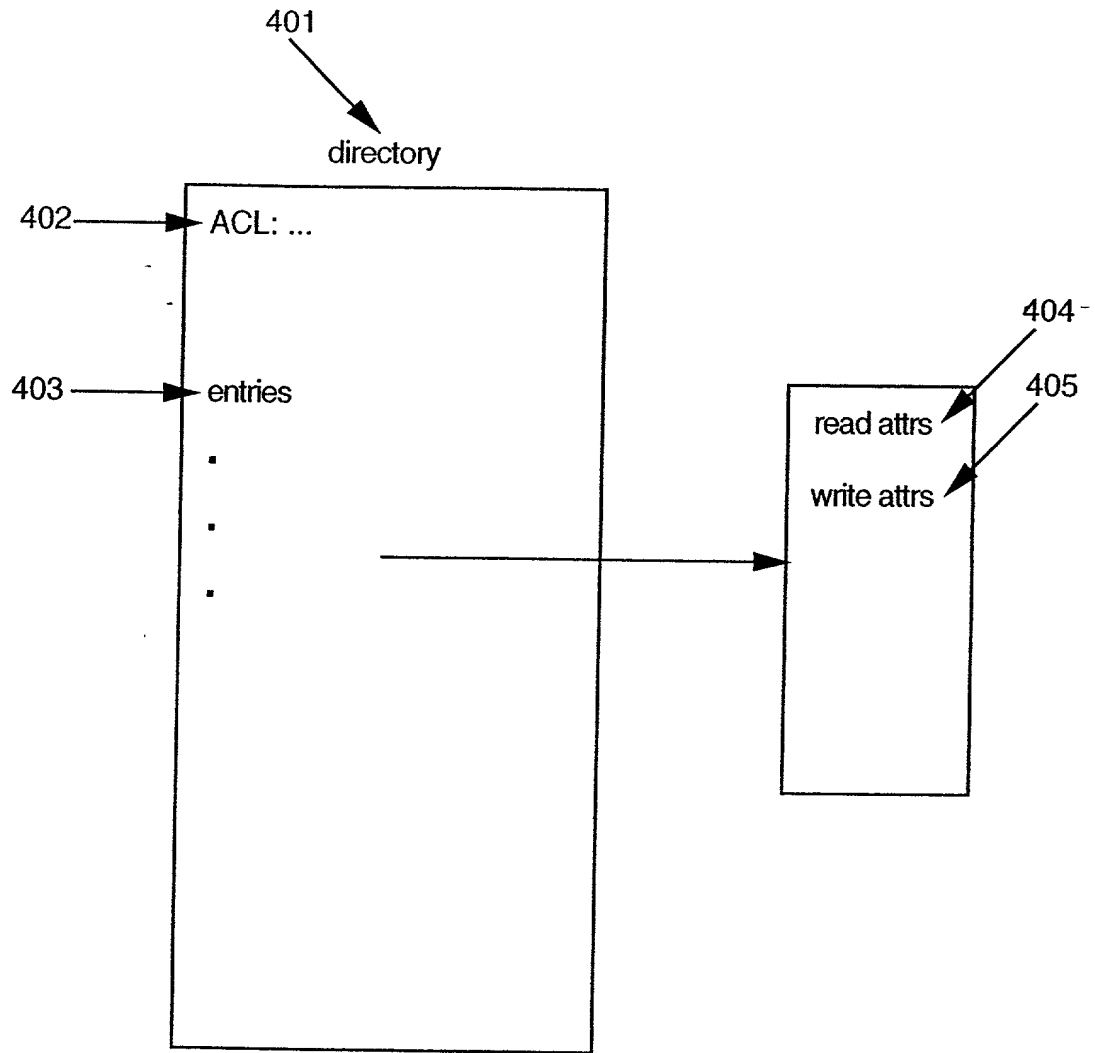


Fig. 4

DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name;

I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

SIMPLIFIED LDAP ACCESS CONTROL LANGUAGE SYSTEM

the specification of which (check one) ☒ is attached hereto, or _____ was filed on _____ as Application Serial No. _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

=====

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Claimed
Yes No

Number Country Day/Month/Year Filed

Number Country Day/Month/Year Filed

=====

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

MICHAEL A. GLENN, Reg. No. 30,176
DONALD M. HENDRICKS, Reg. No. 40,355
KIRK D. WONG, Reg. No. 43,284
EARLE JENNINGS, Reg. No. 44,804

SEND CORRESPONDENCE TO:

MICHAEL A. GLENN, 125 Lake Road, Portola Valley, CA 94028

=====

I hereby claim the benefit under Title 35, United States code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Application Ser. No.

Filing Date

Status: Patented, Pending, Abandoned

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor: PRASANTA BEHERA

Inventor's signature Prasanta K. Behera Date 11/15/99

Residence 40686 Caliente Way, Fremont, California 94539

Post Office Address Same

Citizenship India